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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/488,373	01/20/2000	Toru Morita	SCEI 16.895(100809-16084)	4355

26304 7590 01/25/2005

KATTEN MUCHIN ZAVIS ROSENMAN
575 MADISON AVENUE
NEW YORK, NY 10022-2585

EXAMINER
FAULK, DEVONA E

ART UNIT	PAPER NUMBER
2644	

DATE MAILED: 01/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/488,373	MORITA, TORU	
	Examiner	**Art Unit**	
	Devona E. Faulk	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 September 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9 and 11-18* is/are pending in the application.

4a) Of the above claim(s) *10* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9 and 11-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 9/29/04 have been fully considered but they are not persuasive. The applicant asserts, on pages 12-14, that essentially prior art Wu, Furuhashi, Gotto and Fujimoto fail to teach or suggest of any relationship between the timing of the interrupts and the rise or fall of the sound waveform. The examiner disagrees. Wu discloses frequency data of musical notation that is loaded into the ~~time~~ timer to determine how much time is needed for each interrupt and having a sound wave that is determined from that data (column 5, lines 16-23). Wu also discloses data stored is composed of the time interval data being accumulated in a memory when high signals coming from the walking sensor go low. In, other words the time interval data indicative of the period that the square wave pulse, in low form, coming from the walking sensor ends and the next square wave pulse appears (column 3, lines 54-64). The examiner, therefore, asserts that Wu teaches of the relationship between the timing of the interrupts and the rise or fall of the sound waveform as claimed.

2. Claim 10 is cancelled.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. **Claims 1-4,6-8,15 and 16** are rejected under 35 U.S.C. 102(b) as being anticipated by Wu (U. S. Patent 4,571,680).

Regarding **claim 1**, Wu teaches of an electronic music pace-counting shoe comprising a microcomputer chip (SCP), and having an interrupt service routine where the timer causes the interrupt to change based on frequency data obtained from the musical table of memory M9 and data from memory M6 (column 6- column 7 , line 27) which reads on "dynamically altering a period of a CPU interrupt signal in accordance with a sound data that is read from a CPU memory"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. This all reads on "emitting to a speaker of the electronic device said sound data obtained in connection with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback sound" and "wherein the period of said CPU interrupt signal is dynamically altered to T/n (where n=2,3,...) with respect to period T of said sound data. Wu further discloses ~~Wu discloses~~ frequency data of musical notation that is loaded into the time to determine how much time is needed for each interrupt and having a sound wave that is determined from that data (column 5, lines 16-23) and that data stored is composed of the time interval data being accumulated in a memory when high signals coming from the walking sensor go low. In, other words the time interval data indicative of the period that the square wave pulse, in low form, coming from the

walking sensor ends and the next square wave pulse appears (column 3, lines 54-64). This reads on " and wherein the timing of interrupt corresponds to a rise or fall or a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to T/n.

5. Regarding **claim 2**, Wu teaches of an electronic music pace-counting shoe comprising a microcomputer chip (SCP), and having an interrupt service routine where the timer causes the interrupt to change based on frequency data obtained from the musical table of memory M9 and data from memory M6 (column 6- column 7 , line 27) which reads on "dynamically altering a period of a CPU interrupt signal in accordance with a period T of the sound data that is read from a CPU memory"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. This all reads on "emitting to a speaker of the electronic device said sound data obtained in connection with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback sound" and "wherein the period of said CPU interrupt signal is dynamically altered to T/n (where n=2,3,...) with respect to period T of said sound data. Wu further discloses Wu discloses frequency data of musical notation that is loaded into the time to determine how much time is needed for each interrupt and having a sound wave that is

determined from that data (column 5, lines 16-23) and that data stored is composed of the time interval data being accumulated in a memory when high signals coming from the walking sensor go low. In, other words the time interval data indicative of the period that the square wave pulse, in low form, coming from the walking sensor ends and the next square wave pulse appears (column 3, lines 54-64). This reads on " and wherein the timing of interrupt corresponds to a rise or fall or a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to T/n.

6. Regarding **claim 3**, Wu teaches of an electronic music pace-counting shoe comprising a microcomputer chip (SCP), and having an interrupt service routine where the timer causes the interrupt to change based on frequency data obtained from the musical table of memory M9 and data from memory M6 (column 6- column 7 , line 27) which reads on "dynamically altering a period of a CPU interrupt signal in accordance with a period of the sound data that is read from a CPU memory"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. This all reads on "emitting to a speaker of the electronic device said sound data obtained in connection with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree with each other to

provide a clear playback sound" and "wherein in said altering step the period of the CPU interrupt signal is dynamically altered in correspondence with a period T of said sound data, the period of said CPU interrupt signal is dynamically altered , and the period of said CPU interrupt is dynamically altered to T/n (where n=2,3,...) . Wu further discloses Wu discloses frequency data of musical notation that is loaded into the time to determine how much time is needed for each interrupt and having a sound wave that is determined from that data (column 5, lines 16-23) and that data stored is composed of the time interval data being accumulated in a memory when high signals coming from the walking sensor go low. In, other words the time interval data indicative of the period that the square wave pulse, in low form, coming from the walking sensor ends and the next square wave pulse appears (column 3, lines 54-64). This reads on " and wherein the timing of interrupt corresponds to a rise or fall or a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to T/n.

7. Regarding **claim 4**, Wu teaches of an electronic music pace-counting shoe comprising a microcomputer chip (SCP), and having an interrupt service routine where the timer causes the interrupt to change based on frequency data obtained from the musical table of memory M9 and data from memory M6 (column 6- column 7 , line 27) which reads on "dynamically altering a period of a CPU interrupt signal in accordance with a period of the sound data that is read from a CPU memory"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the

number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. This all reads on "emitting to a speaker of the electronic device said sound data obtained in connection with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback sound" and "wherein in said altering step the period of the CPU interrupt signal is dynamically altered in correspondence with a period T of said sound data, the period of said CPU interrupt signal is dynamically altered , and the period of said CPU interrupt is dynamically altered to T/2. Wu further discloses Wu discloses frequency data of musical notation that is loaded into the time to determine how much time is needed for each interrupt and having a sound wave that is determined from that data (column 5, lines 16-23) and that data stored is composed of the time interval data being accumulated in a memory when high signals coming from the walking sensor go low. In, other words the time interval data indicative of the period that the square wave pulse, in low form, coming from the walking sensor ends and the next square wave pulse appears (column 3, lines 54-64). This reads on " and wherein the timing of interrupt corresponds to a rise or fall or a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to T/2.

8. Regarding **claim 6**,Wu teaches of an electronic music pace-counting shoe comprising a microcomputer (SCP) comprising a timer (column 2, line 47) and a timer interrupt routine (column 6, lines 56-61) which reads on" a timer unit that generates a CPU interrupt signal". The

microcomputer (SCP) reads on the CPU. The timer is a part of the microcomputer so this reads on " a timer unit that generates a CPU interrupt signal"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. Thus P16 outputs digital data. D/A converters can be found in many devices and thus it would have been obvious to incorporate a digital to analog converter in order to be able to output analog data. This reads on "a CPU that specifies sound data by the timing of said CPU interrupt signal", "said CPU controlling said timer unit in accordance with a period T of said sound data, dynamically altering a period of said CPU interrupt signal, causing a switching timing of said sound data and the period of said CPU interrupt signal to agree, and generating a clear playback sound" and " wherein the period of said CPU interrupt signal is dynamically altered to T/n (where n=2,3...) with respect to period T of sound data". Wu further discloses Wu discloses frequency data of musical notation that is loaded into the time to determine how much time is needed for each interrupt and having a sound wave that is determined from that data (column 5, lines 16-23) and that data stored is composed of the time interval data being accumulated in a memory when high signals coming from the walking sensor go low. In, other words the time interval data indicative of the period that the square wave pulse, in low form, coming from the walking sensor ends and the next square wave pulse appears (column 3, lines 54-64). This reads on " and wherein the timing of interrupt corresponds to a rise or fall or a sound waveform of said sound data and discrepancy between the

timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to T/n.

9. Regarding **claim 7**, Wu teaches of an electronic music pace-counting shoe comprising a microcomputer (SCP) comprising a timer (column 2, line 47) and a timer interrupt routine (column 6, lines 56-61) which reads on" a timer unit that generates a CPU interrupt signal". The microcomputer (SCP) reads on the CPU. The timer is a part of the microcomputer so this reads on " a timer unit that generates a CPU interrupt signal"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. Thus P16 outputs digital data. D/A converters can be found in many devices and thus it would have been obvious to incorporate a digital to analog converter in order to be able to output analog data. This reads on "a CPU that specifies sound data by the timing of said CPU interrupt signal" , "said CPU controlling said timer unit in accordance with a period of said sound data, dynamically altering a period of said CPU interrupt signal, causing a switching timing of said sound data and the period of said CPU interrupt signal to agree, and generating a clear playback sound" and " wherein the period of said CPU interrupt signal is dynamically altered to T/n (where n=2,3...) with respect to period T of sound data". Wu further discloses Wu discloses frequency data of musical notation that is loaded into the time to determine how much time is needed for each interrupt and having a sound wave that is

determined from that data (column 5, lines 16-23) and that data stored is composed of the time interval data being accumulated in a memory when high signals coming from the walking sensor go low. In, other words the time interval data indicative of the period that the square wave pulse, in low form, coming from the walking sensor ends and the next square wave pulse appears (column 3, lines 54-64). This reads on " and wherein the timing of interrupt corresponds to a rise or fall or a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to T/n.

Claim 8 claims the electronic device of claim 7 wherein the period of said CPU interrupt signal is dynamically altered to T/2. All elements of claim 8 are comprehended by claim 7, therefore claim 8 is rejected for reasons stated above in claim 7.

10. Regarding **claim 15**, Wu teaches of an electronic music pace-counting shoe comprising a microcomputer chip (SCP), and having an interrupt service routine where the timer causes the interrupt to change based on frequency data obtained from the musical table of memory M9 and data from memory M6 (column 6- column 7, line 27) which reads on "dynamically altering a period of a CPU interrupt signal, that has been generated by a timer using a down-counter, in accordance with a sound data that is read from a CPU memory"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n

is 2 because there are 2 interrupts per cycle of the square wave. This all reads on "emitting to a speaker of the electronic device said sound data obtained in connection with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback sound" and "wherein said sound data has a period and wherein said CPU controls the down-counter based on the period of the sound data and "wherein the period of said CPU interrupt signal is dynamically altered to T/n (where n=2,3,...) with respect to period T of said sound data. Wu further discloses Wu discloses frequency data of musical notation that is loaded into the time to determine how much time is needed for each interrupt and having a sound wave that is determined from that data (column 5, lines 16-23) and that data stored is composed of the time interval data being accumulated in a memory when high signals coming from the walking sensor go low. In, other words the time interval data indicative of the period that the square wave pulse, in low form, coming from the walking sensor ends and the next square wave pulse appears (column 3, lines 54-64). This reads on " and wherein the timing of interrupt corresponds to a rise or fall or a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to T/n.

11. Regarding **claim 16**, Wu teaches of an electronic music pace-counting shoe comprising a microcomputer chip (SCP), and having an interrupt service routine where the timer causes the interrupt to change based on frequency data obtained from the musical table of memory M9 and data from memory M6 (column 6- column 7 , line 27) which reads on "dynamically altering a period of a CPU interrupt signal, that has been generated by a timer using a down-counter, in

accordance with a period T of the sound data that is read from a CPU memory"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect, which reads on "emitting to a speaker of the electronic device said sound data obtained in connection with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback sound" and "wherein said CPU controls the down-counter based on the period of the sound data and "wherein the period of said CPU interrupt signal is dynamically altered to T/n (where n=2,3,...) with respect to period T of said sound data. Wu further discloses Wu discloses frequency data of musical notation that is loaded into the time to determine how much time is needed for each interrupt and having a sound wave that is determined from that data (column 5, lines 16-23) and that data stored is composed of the time interval data being accumulated in a memory when high signals coming from the walking sensor go low. In, other words the time interval data indicative of the period that the square wave pulse, in low form, coming from the walking sensor ends and the next square wave pulse appears (column 3, lines 54-64). This reads on " and wherein the timing of interrupt corresponds to a rise or fall or a sound waveform of said sound data and discrepancy between the timing of said period of said

CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to T/n.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimoto et al. (U.S. Patent 6,238,291) in view of Wu (U.S. Patent 4,571,680) .

Regarding **claim 5**, Fujimoto discloses a device that comprises a CPU (400) that comprises an image circuit and an acoustic circuit , which reads on "image and audio data under CPU control" (See Figure 3). The acoustic circuit is connected to a speaker. Fujimoto fails to discloses a CPU controlling a timer, emitting to the speaker said sound data as claimed, wherein the period of the CPU interrupt is dynamically altered as claimed and wherein the timing of the interrupt corresponds to a rise and fall of a sound waveform. Wu teaches of a microcomputer (SCP) comprising a timer (column 2, line 47) and a timer interrupt routine (column 6, lines 56-61) which reads on" a timer unit that generates a CPU interrupt signal". The microcomputer (SCP) reads on the CPU. The timer is a part of the microcomputer so this reads on " a timer unit

that generates a CPU interrupt signal"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. Thus P16 outputs digital data. D/A converters can be found in many devices and thus it would have been obvious to incorporate a digital to analog converter in order to be able to output analog data. This reads on "controlling said timer unit that generates a CPU interrupt signal in accordance with said read audio data to dynamically alter said CPU interrupt signal", "emitting to the speaker said sound data obtained in accordance with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree, the burden on the CPU is reduced , and a playback sound is generated from the speaker" and " wherein the period of the CPU interrupt signal is dynamically altered in correspondence with a period T of said sound data and the period t of said CPU interrupt signal is dynamically altered to T/n where n=2,3..... Fujimoto discloses a device that comprises a CPU (400) that comprises an image circuit and an acoustic circuit , which reads on "image and audio data under CPU control" (See Figure 3). The acoustic circuit is connected to a speaker. It would have been obvious to one of ordinary skill in the art at the time of invention to use Wu's microcomputer and concept of changing the interrupt in Fujimoto's device for the benefit of having a less expensive method of producing synthesized sound.

14. **Claims 9 and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable Furuhashi (U.S. Patent 5,789,690) in view of Kudo et al. (U.S. Patent 6,560,692) in further view of Wu (U.S. Patent 4,571,680).

Regarding **claim 9**, Furuhashi discloses a portable electronic device comprising a microcomputer and a speakers a method for generating playback sound in an electronic device through an interrupt information generating apparatus and speech information processing apparatus including a CPU (51) and a speaker (73) (See Figure 1) , which reads on "CPU", controls the addressing means for outputting the specified address information indicating the leading address of the speech information and the interrupt data is supplied to the central processing unit at the playback timing of the desired sound source data . [This reads on "dynamically altering a CPU interrupt signal in accordance with a sound data that is read from a CPU memory"]; a D/A processor, which converts the sound source data into analog signals to generate speech signals, which are outputted to the speaker unit (column 8, line 44). The memory is the means for controlling the CPU. Although he teaches on the above elements Furahashi fails to teach of a timer connect to a clock. This concept was well known in the art at the time of filing as taught by Kudo. Kudo discloses a microcomputer comprising an 8-bit timer (960) connected to a clock timer (970) (Figure 23) and an interrupt controller (800). Although he teaches of a clock connected to a timer, Kudo fails to disclose a timer unit generating an interrupt signal using said down-counter, wherein said CPU dynamically alters the period T of said interrupt signal as claimed and wherein the timing of interrupt corresponds to a rise or fall of a sound waveform as claimed. This concept was well known in the art at the time of filing as taught by Wu. Wu discloses the concept of a down counter and the CPU controlling said down-

counter based on the period of the sound data (column 1, lines 41-63). This reads on "down counter" and an electronic means as claimed. Wu further discloses that the incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect, which reads on and "wherein said CPU dynamically alters the period T of said CPU interrupt to T/n (where n=2,3,...) " as claimed. Wu further discloses Wu discloses frequency data of musical notation that is loaded into the time to determine how much time is needed for each interrupt and having a sound wave that is determined from that data (column 5, lines 16-23) and that data stored is composed of the time interval data being accumulated in a memory when high signals coming from the walking sensor go low. In, other words the time interval data indicative of the period that the square wave pulse, in low form, coming from the walking sensor ends and the next square wave pulse appears (column 3, lines 54-64). This reads on " and wherein the timing of interrupt corresponds to a rise or fall or a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to T/n. It would have been obvious to one of ordinary skill in the art to use Fudo's concept of a timer connected to a clock and Wu concept of dynamically altering the interrupt for the benefit of having a less expensive manner of producing synthesized sound.

Claim 11 is comprehended by claim 9. Therefore claim 11 is rejected for reasons stated above in 9.

15. **Claim 12** is rejected under 35 U.S.C. 103(a) as being unpatentable Furuhashi (U.S. Patent 5,789,690) in view of Kudo et al. (U.S. Patent 6,560,692) in further view of Wu (U.S. Patent 4,571,680) in further view of Fujimoto et al. (U.S. Patent 6,238,291).

Claim 12 claims the electronic device of claim 9, which is a portable electronic device that is detachably connected to a parent machine and can play a game independently when detached from said parent machine. The combination of Furuhashi, Kudo and Wu fail to disclose the claimed matter. Furuhashi disclose a portable electronic device but fails to disclose that that device is detachably connected to a parent machine as claimed. Fujimoto discloses the concept of an electronic device that is a portable electronic device as claimed (See abstract; Figure1). Thus it would have been obvious to have the electronic device be detachably connected to a parent machine for the benefit of providing the ability to have more than two players play a game at the same time.

16. **Claims 13 and 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimoto et al. (U.S. Patent 6238,291 in view of Wu (U.S. Patent 4,571,680).

Regarding **claim 13**, Fujimoto discloses an entertainment system comprising a portable electronic device comprising having "a CPU" (See Abstract; Figures 1 and 6). Fujimoto fails to disclose a CPU specifying sound data, a timer and wherein the period of said CPU interrupt signal is dynamically altered as claimed. This concept was well known in the art at the time of filing as taught by Wu. Wu discloses a microcomputer (SCP), which reads on "CPU", comprising a timer (column 2, line 47) and a timer interrupt routine (column 6, lines 56-61)

which reads on" a timer unit that generates a CPU interrupt signal". The microcomputer (SCP) reads on the CPU. The timer is a part of the microcomputer so this reads on " a timer unit that generates a CPU interrupt signal"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. Thus P16 outputs digital data. D/A converters can be found in many devices and thus it would have been obvious to incorporate a digital to analog converter in order to be able to output analog data. .Wu further discloses Wu discloses frequency data of musical notation that is loaded into the time to determine how much time is needed for each interrupt and having a sound wave that is determined from that data (column 5, lines 16-23) and that data stored is composed of the time interval data being accumulated in a memory when high signals coming from the walking sensor go low. In, other words the time interval data indicative of the period that the square wave pulse, in low form, coming from the walking sensor ends and the next square wave pulse appears (column 3, lines 54-64). This reads on " and wherein the timing of interrupt corresponds to a rise or fall or a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to T/n. Using Wu's microcomputer and concept of changing the interrupt would read on " a timer that generates a CPU interrupt signal", "said CPU specifying a sound data by the timing of said CPU interrupt signal", " a speaker that emits sound

corresponding to said analog signal" and "wherein the period of said CPU interrupt signal is dynamically altered to T/n (where n=2,3,...) with respect to a period of said sound data". It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Fujimoto's portable electronic device by using Wu's microcomputer and interrupt processing for the benefit of having a less expensive method of producing synthesized sound.

17. Regarding **claim 14**, Fujimoto discloses an entertainment system comprising a portable electronic device comprising having "a CPU" (See Abstract; Figures 1 and 6). Fujimoto fails to disclose a CPU specifying sound data, a timer and wherein the period of said CPU interrupt signal is dynamically altered as claimed. This concept was well known in the art at the time of filing as taught by Wu. Wu discloses a microcomputer (SCP), which reads on "CPU", comprising a timer (column 2, line 47) and a timer interrupt routine (column 6, lines 56-61) which reads on" a timer unit that generates a CPU interrupt signal". The microcomputer (SCP) reads on the CPU. The timer is a part of the microcomputer so this reads on " a timer unit that generates a CPU interrupt signal"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. Thus P16 outputs digital data. D/A converters can be found in many devices and thus it would have been obvious to incorporate a digital to analog converter in order to be able to output analog data. Wu further discloses Wu discloses frequency data of musical notation that is loaded into the time to determine how much time is needed for each interrupt and

having a sound wave that is determined from that data (column 5, lines 16-23) and that data stored is composed of the time interval data being accumulated in a memory when high signals coming from the walking sensor go low. In, other words the time interval data indicative of the period that the square wave pulse, in low form, coming from the walking sensor ends and the next square wave pulse appears (column 3, lines 54-64). This reads on " and wherein the timing of interrupt corresponds to a rise or fall or a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to T/n. Using Wu's microcomputer and concept of changing the interrupt would read on " a timer that generates a CPU interrupt signal", "said CPU specifying a sound data by the timing of said CPU interrupt signal", " a speaker that emits sound corresponding to said analog signal" and "wherein the period of said CPU interrupt signal is dynamically altered to T/n (where T is a period of the sound data and n=2,3,...)". It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Fujimoto's portable electronic device by using Wu's microcomputer and interrupt processing for the benefit of having a less expensive method of producing synthesized sound.

18. **Claim 17** is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (U.S. Patent 4,571,680) in view of Saito (U.S. Patent 5,576, 685).

Regarding **claim 17**,Wu teaches of an electronic music pace-counting shoe (electronic device) comprising a microcomputer (SCP) comprising a timer (column 2, line 47) and a timer interrupt routine (column 6, lines 56-61). The microcomputer (SCP) reads on the CPU. The timer is a part of the microcomputer so this reads on " a timer unit that generates a CPU interrupt

signal"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. Thus P16 outputs digital data. Thus n is 2 because there are 2 interrupts per cycle of the square wave. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect, which reads on "a speaker of that emits sound that corresponds to said analog signal" and "said CPU controlling said the down-counter " as claimed and "wherein the period of said CPU interrupt signal is dynamically altered to T/n (where n=2,3,...) with respect to period T of said sound data. D/A converters can be found in many devices and thus it would have been obvious to incorporate a digital to analog converter in order to be able to output analog data. This reads on "a CPU that specifies sound data by the timing of said CPU interrupt signal". Wu further discloses Wu discloses frequency data of musical notation that is loaded into the time to determine how much time is needed for each interrupt and having a sound wave that is determined from that data (column 5, lines 16-23) and that data stored is composed of the time interval data being accumulated in a memory when high signals coming from the walking sensor go low. In, other words the time interval data indicative of the period that the square wave pulse, in low form, coming from the walking sensor ends and the next square wave pulse appears (column 3, lines 54-64). This reads on " and wherein the timing of interrupt corresponds to a rise or fall or a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the

rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to T/n. Although Wu teaches of the above elements, he fails to disclose a timer unit that generates a CPU interrupt signal using a down-counter. However this concept was well known in the art at the time of filing as taught by Saito. Saito discloses a timer (40) that comprises a presettable counter to down-count preset data. This data is used to output an interrupt signal (column 3, lines 21-26). Replacing Wu's timer with Saito's timer reads on " a timer unit that generates a CPU interrupt using a down-counter" , "said CPU controlling said down-counter in accordance with a period T of said sound data, dynamically altering a period of said CPU interrupt signal, causing a switching timing of said sound data and the period of said CPU interrupt signal to agree, and generating a clear playback sound" . . It would have been obvious to one of ordinary skill in the art at the time of invention to use Wu's microcomputer and concept of changing the interrupt and Saito's concept of a timer for the benefit of having a less expensive method of producing synthesized sound.

19. **Claim 18** is rejected under 35 U.S.C. 103(a) as being unpatentable Wu (U.S. Patent 4,571,680) in view of Saito (U.S. Patent 5,576, 685).

Regarding **claim 18**, Wu teaches of a portable electronic device. Wu discloses a microcomputer (SCP), which reads on "CPU", comprising a timer (column 2, line 47) and a timer interrupt routine (column 6, lines 56-61) which reads on" a timer unit that generates a CPU interrupt signal". The microcomputer (SCP) reads on the CPU. The timer is a part of the microcomputer so this reads on " a timer unit that generates a CPU interrupt signal"; and an output port (P16; Figure 1) that provides output signals corresponding to the sound beats or music upon walking to the amplifier (AMP) and speaker (SP). The incurrence of interrupt is

applied to alternately make P16 become 1 or 0. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect (column 6, lines 56-60). Thus n is 2 because there are 2 interrupts per cycle of the square wave. Thus P16 outputs digital data. The time and the number of times set for causing interrupt is applied to control the output frequency P16 and to provide a music effect, which reads on "a speaker of that emits sound that corresponds to said analog signal" and "said CPU controlling said the down-counter " as claimed and "wherein the period of said CPU interrupt signal is dynamically altered to T/n (where n=2,3,...) with respect to period T of said sound data. D/A converters can be found in many devices and thus it would have been obvious to incorporate a digital to analog converter in order to be able to output analog data. This reads on "a CPU that specifies sound data by the timing of said CPU interrupt signal". D/A converters can be found in many devices and thus it would have been obvious to incorporate a digital to analog converter in order to be able to output analog data. Wu further discloses Wu discloses frequency data of musical notation that is loaded into the time to determine how much time is needed for each interrupt and having a sound wave that is determined from that data (column 5, lines 16-23) and that data stored is composed of the time interval data being accumulated in a memory when high signals coming from the walking sensor go low. In, other words the time interval data indicative of the period that the square wave pulse, in low form, coming from the walking sensor ends and the next square wave pulse appears (column 3, lines 54-64). This reads on " and wherein the timing of interrupt corresponds to a rise or fall or a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of

said CPU interrupt signal to T/n. Wu teaches of the concept of down-counting (column 1, lines 41-63). Although Wu teaches of the above elements, he fails to disclose a timer unit that generates a CPU interrupt signal using a down-counter. However this concept was well known in the art at the time of filing as taught by Saito. Saito discloses a timer (40) that comprises a presettable counter to down-count preset data. This data is used to output an interrupt signal (column 3, lines 21-26). Replacing Wu's timer with Saito's timer reads on " a timer unit that generates a CPU interrupt using a down-counter", "said CPU controlling said down-counter in accordance with a period T of said sound data, dynamically altering a period of said CPU interrupt signal, causing a switching timing of said sound data and the period of said CPU interrupt signal to agree, and generating a clear playback sound". It would have been obvious to one of ordinary skill in the art at the time of invention to use Wu's microcomputer and concept of changing the interrupt and Saito's concept of a timer for the benefit of having a less expensive method of producing synthesized sound. Although Wu teaches on the above elements, he fails to teach of a timer that generates a CPU interrupt signal using a down-counter. However, this concept was well known in the art at the time of filing as taught by Saito. . Saito discloses a timer (40) that comprises a presettable counter to down-count preset data. This data is used to output an interrupt signal (column 3, lines 21-26). Using Saito's concept of a timer using a down-counter would read on " a timer that generates a CPU interrupt signal using a down-counter", "said CPU specifying a sound data by the timing of said CPU interrupt signal", " a speaker that emits sound corresponding to said analog signal" and "wherein the CPU controls said down-counter based on a period of said sound data". It would have been obvious to use

Saito's concept of a timer generating a CPU using a down-counter of changing the interrupt for the benefit of having a less expensive manner of producing synthesized sound.

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Devona E. Faulk whose telephone number is 703-305-4359. The examiner can normally be reached on 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huyen Le can be reached on 703-305-4844. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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